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(54) **METHOD AND SYSTEM FOR OPERATING AN ENGINE IN A MULTI-ENGINE AIRCRAFT**

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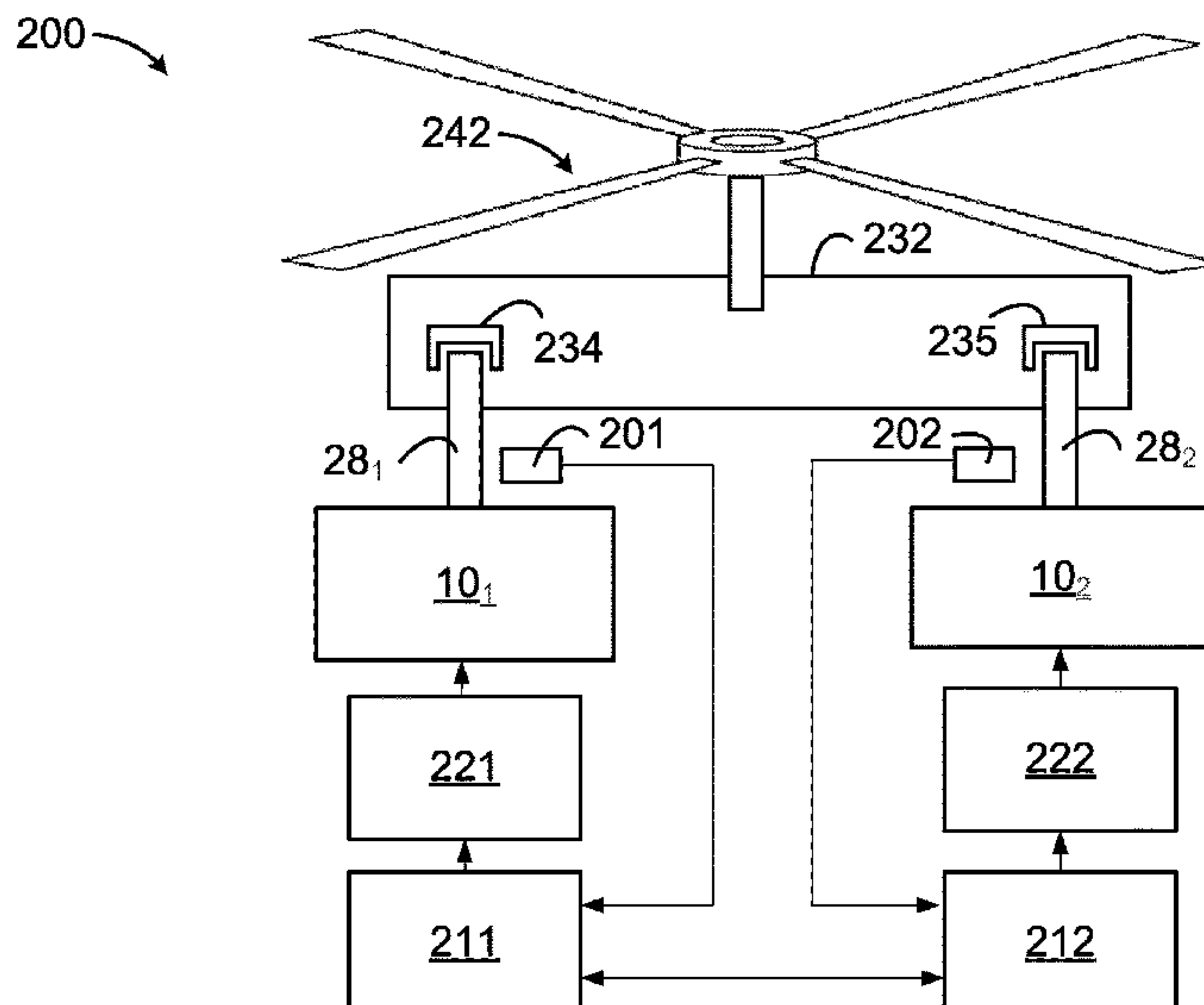
(57) **ABSTRACT**

Systems and methods for operating an engine in a multi-engine rotorcraft are described herein. A first parameter indicative of torque of a first engine is obtained. A decrease of the first parameter is detected. In response to detecting the decrease of the first parameter, an autorotation of the rotorcraft is accommodated. A second parameter indicative of torque of a second engine of the rotorcraft is assessed while accommodating the autorotation. If the second parameter has not decreased, a shaft shear of the first engine is identified and accommodating of the autorotation is ended. If the second parameter has decreased, the accommodating is maintained.

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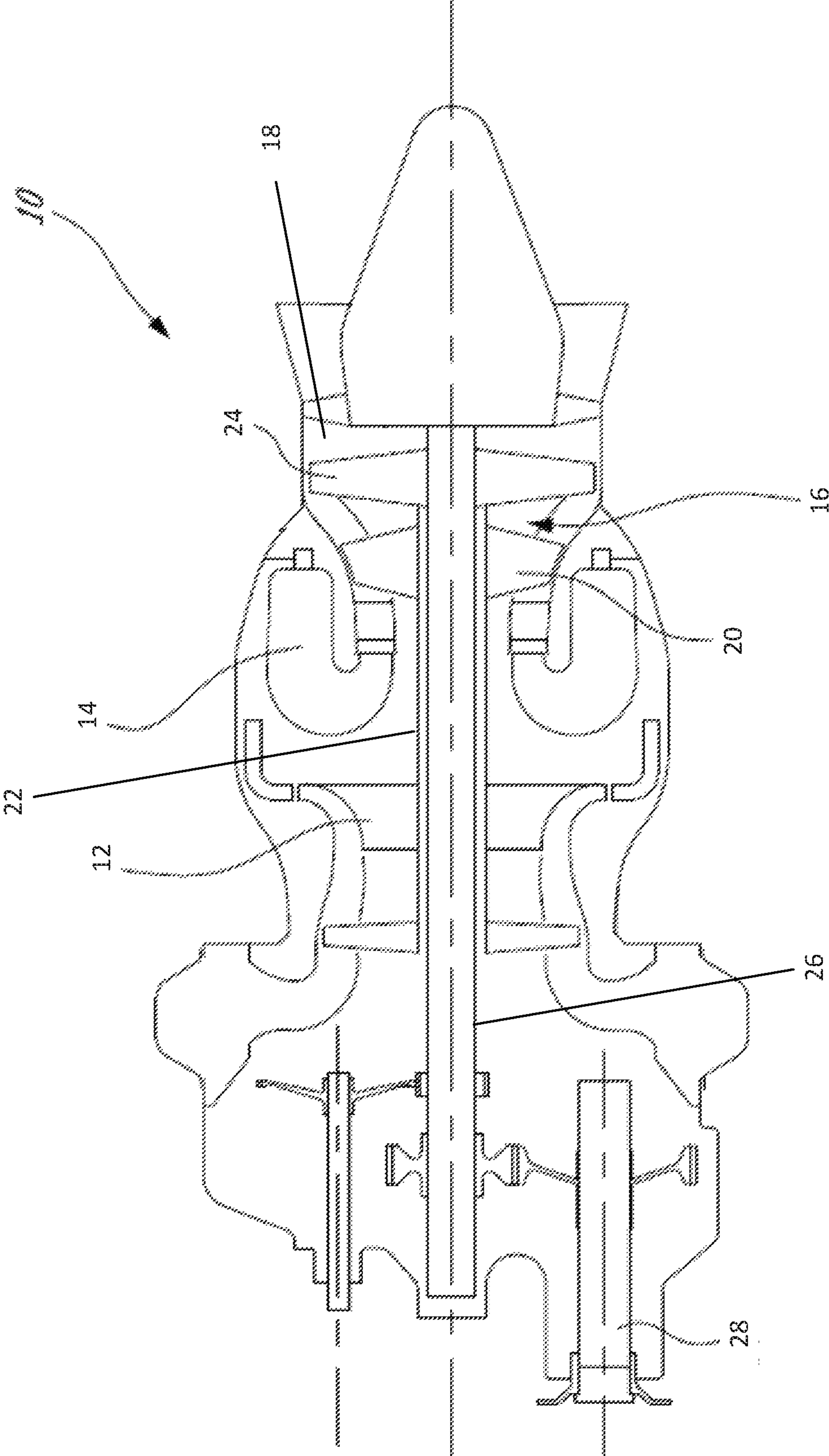


FIGURE 1

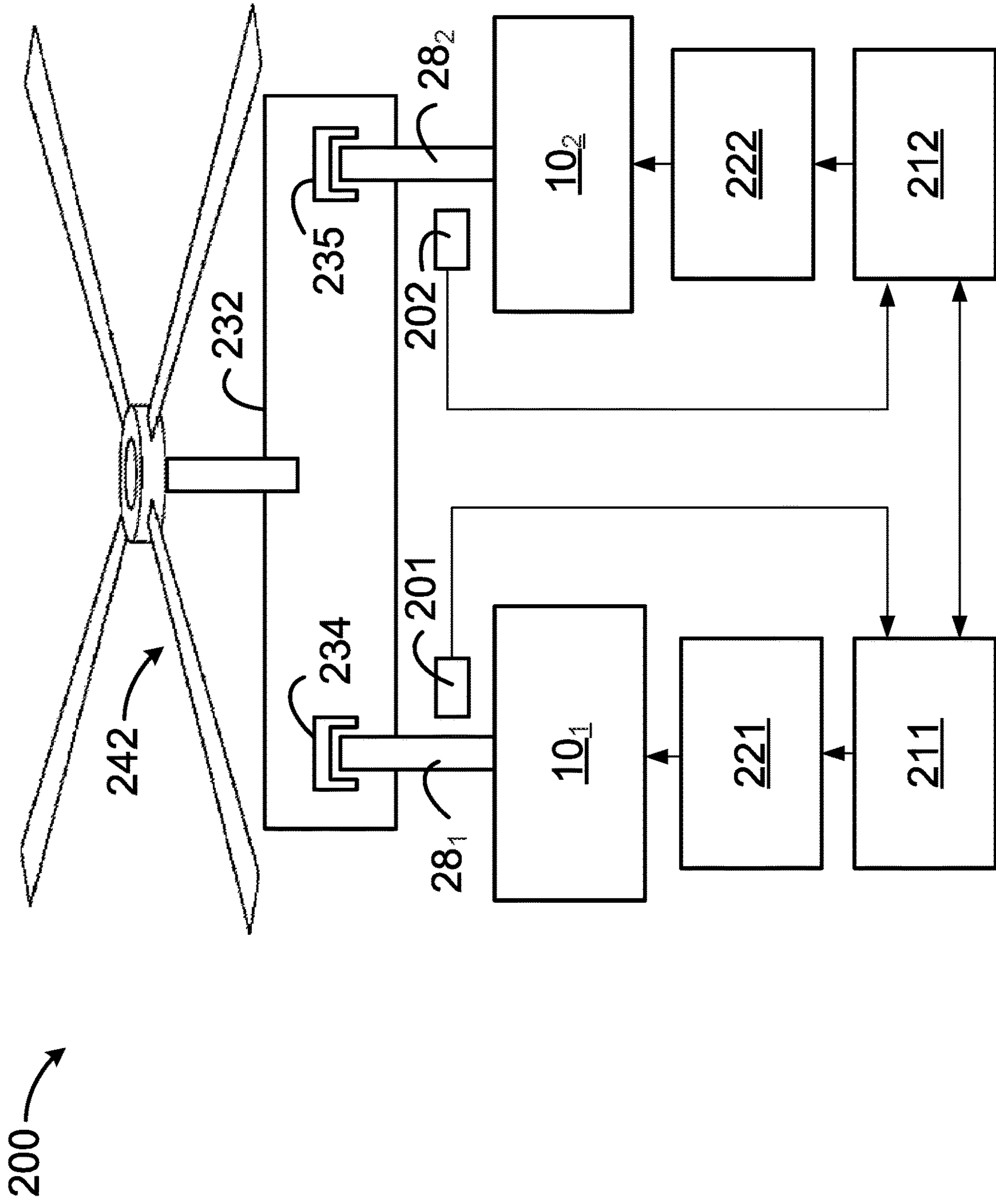


FIGURE 2A

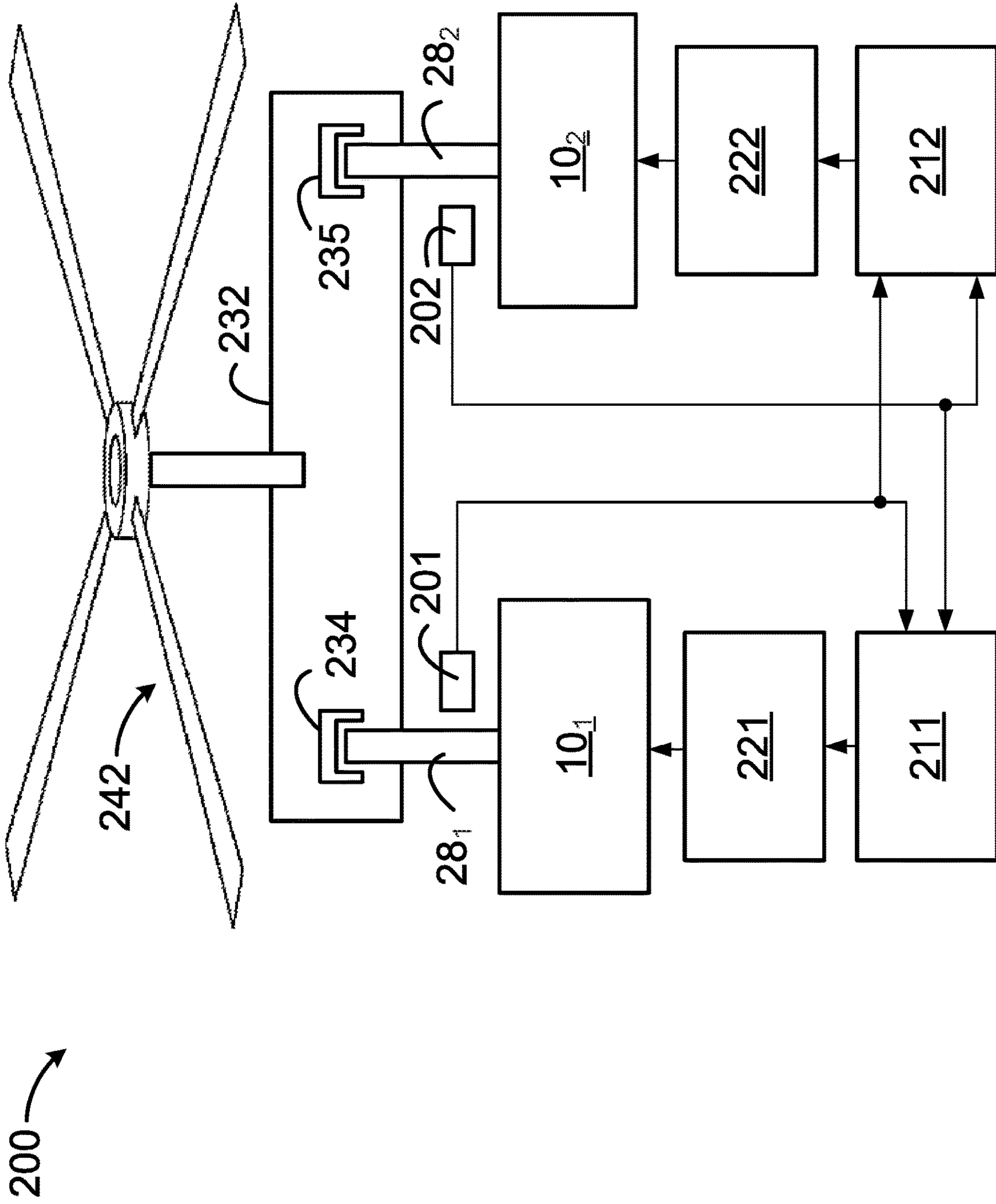


FIGURE 2B

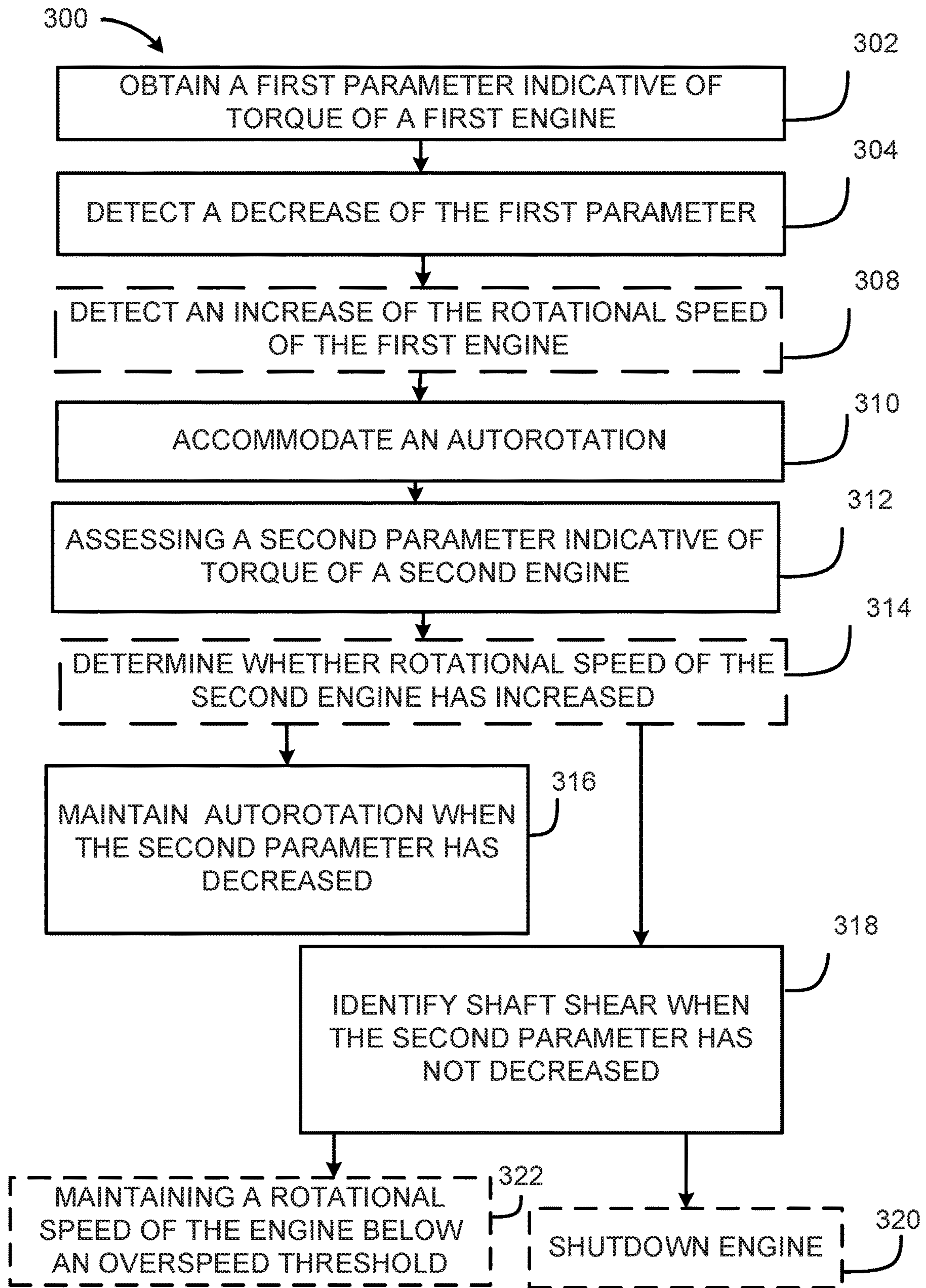


FIGURE 3

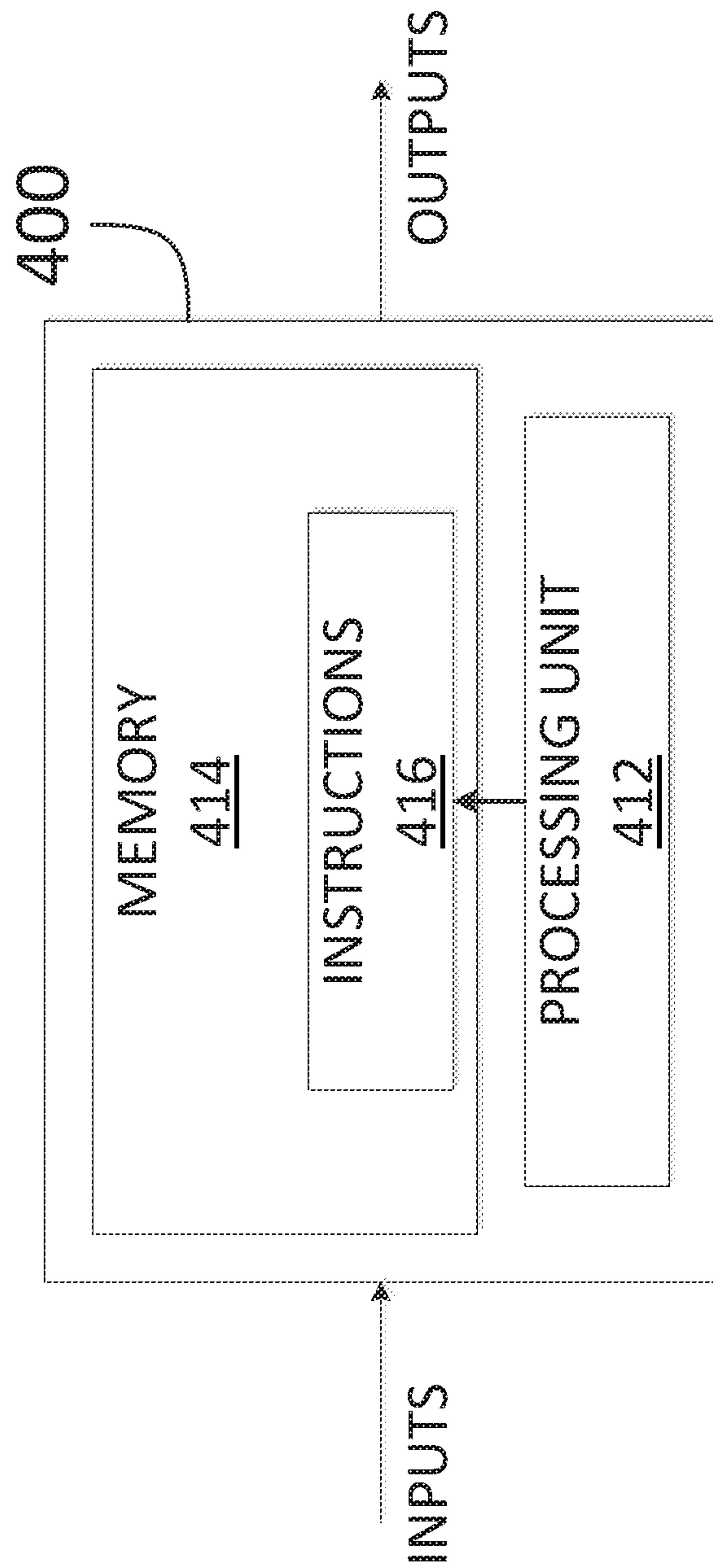


FIGURE 4

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**METHOD AND SYSTEM FOR OPERATING
AN ENGINE IN A MULTI-ENGINE
AIRCRAFT**

TECHNICAL FIELD

The present disclosure relates generally to engine control, and, more particularly, to operating an engine in a multi-engine aircraft.

BACKGROUND OF THE ART

On a rotorcraft, such as a dual-engine helicopter, there are two engines which are coupled to a gearbox to drive the rotorcraft's rotor. When the rotor spins faster than the output shafts of the engines this results in an event known as autorotation. When autorotation occurs the rotor turns without being driven by the engines, as the output shafts of the engines becomes decoupled from the rotorcraft's gearbox. When the output shafts of the engines becomes decoupled, torque on the output shafts drops to zero. Torque remains at zero until the output shafts become recoupled with the gearbox and rotates at the same speed as the rotor.

Another event that can result in torque on an output shaft dropping to zero is a shaft shear.

There is a need for improvement.

SUMMARY

In one aspect, there is provided a method for operating an engine in a multi-engine rotorcraft. The method comprises obtaining a first parameter indicative of torque of a first engine, detecting a decrease of the first parameter indicative of torque of the first engine, accommodating an autorotation in response to detecting the decrease of the first parameter, assessing a second parameter indicative of torque of a second engine of the rotorcraft while accommodating the autorotation, if the second parameter has not decreased, identifying a shaft shear of the first engine and ending the accommodating of the autorotation, and if the second parameter has decreased, maintaining the accommodating.

In one aspect, there is provided a system for operating an engine in a multi-engine rotorcraft. The system comprises at least one processing unit and a non-transitory computer-readable memory having stored thereon program instructions. The program instructions are executable by the at least one processing unit for obtaining a first parameter indicative of torque of a first engine, detecting a decrease of the first parameter indicative of torque of the first engine, accommodating an autorotation in response to detecting the decrease of the first parameter, assessing a second parameter indicative of torque of a second engine of the rotorcraft while accommodating the autorotation, if the second parameter has not decreased, identifying a shaft shear of the first engine and ending the accommodating of the autorotation, and if the second parameter has decreased, maintaining the accommodating.

In one aspect, there is provided a method for operating an engine in a multi-engine rotorcraft. The method comprises obtaining a first parameter indicative of torque of a first engine, detecting a decrease of the first parameter indicative of torque of the first engine, in response to detecting the decrease of the first parameter, accommodating an autorotation by adjusting fuel flow to the first engine to maintain a rotational speed of the first engine substantially at a rotational speed target, assessing a second parameter indicative of torque of a second engine of the rotorcraft while

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accommodating the autorotation, if the second parameter has not decreased, identifying a shaft shear of the first engine and ending the accommodating of the autorotation, and if the second parameter has decreased, maintaining the accommodating.

DESCRIPTION OF THE DRAWINGS

Reference is now made to the accompanying figures in which:

FIG. 1 is a schematic of an example gas turbine engine; FIGS. 2A-2B are schematic diagrams illustrating example systems for controlling an engine in a multi-engine rotorcraft;

FIG. 3 is a flowchart of an example method for controlling an engine in a multi-engine rotorcraft; and

FIG. 4 is a block diagram of an example computing device for controlling an engine.

It will be noted that throughout the appended drawings, like features are identified by like reference numerals.

DETAILED DESCRIPTION

FIG. 1 illustrates a gas turbine engine 10 of a type that may be provided for use in flight, generally comprising in serial flow communication a compressor section 12 for pressurizing the air, a combustor 14 in which the compressed air is mixed with fuel and ignited for generating an annular stream of hot combustion gases, and a turbine section 16 for extracting energy from the combustion gases. The combustion gases flowing out of the combustor 14 circulate through the turbine section 16 and are expelled through an exhaust duct 18. The turbine section 16 includes a compressor turbine 20 in driving engagement with the compressor section 12 through a high pressure shaft 22, and a power turbine 24 in driving engagement with a power shaft 26. The power shaft 26 is in driving engagement with an output shaft 28 through a reduction gearbox (not illustrated).

FIG. 2A illustrates a system 200 for controlling an engine in a multi-engine rotorcraft, in accordance with an embodiment. In this embodiment, a first engine 10₁ and a second engine 10₂ of the rotorcraft are shown. The engines 10₁, 10₂ are gas turbine engines, such as the engine 10. A first output shaft 28₁ of the first engine 10₁ and a second output shaft 28₂ of the second engine 10₂ are selectively coupled with a rotor 242, through an rotorcraft gearbox 232. The rotorcraft gearbox 232 combines the torque delivered by the engines 10₁, 10₂ to the rotor 242. Each output shaft 28₁, 28₂ is independently engaged or disengaged from the gearbox 232. For example, clutches 234, 235 can be used to independently engage or disengage the output shafts 28₁, 28₂ from the gearbox 232. That is, a given clutch (e.g., the clutch 234) is coupled to a component, such as a gear, of the gearbox 232 and can selectively couple or decouple a given output shaft (e.g., the shaft 28₁) to/from the clutch. When one or both of the output shafts 28₁, 28₂ are engaged with the gearbox 232, the output shafts that are engaged with the gearbox 232 drive the rotor 242. When the output shafts 28₁, 28₂ are disengaged from the gearbox 232, rotation of the output shafts 28₁, 28₂ does not drive the rotor 242.

When the rotor 242 rotates faster than the output shafts 28₁, 28₂, autorotation occurs and the output shafts 28₁, 28₂ both become decoupled from the gearbox 232. In accordance with an embodiment, the autorotation is initiated by pilot command. For example, if the pilot commands a pitch angle of the rotor blades through a collective pitch control lever to an angle having a finer pitch, the rotor 242 begins

to rotate faster due to the reduced amount of drag placed on the rotor blades. This can cause the rotor **242** to rotate faster than the output shafts **28₁**, **28₂**, causing the output shafts **28₁**, **28₂** to become decoupled from the gearbox **232**. Using the first engine **10₁** as an example, when the first output shafts **28₁** becomes decoupled from the gearbox **232**, torque on the first output shaft **28₁** decreases to zero and the rotational speed increases due to the loss of load. A first speed sensor **201** may be used to measure the rotational speed of the first output shaft **28₁** and provide the rotational speed to a first engine controller **211**. The first engine controller **211** determines torque of the first engine **10₁** based on the rotational speed of the first output shaft **28₁**. The first engine controller **211** is configured to detect when there is a decrease in torque and/or an increase in rotational speed of the first engine **10₁**. In response to detecting the decrease in torque and/or the increase in rotational speed, the controller **211** assumes that autorotation of the first engine **10₁** is occurring and accommodates for the autorotation. In accordance with an embodiment, accommodating for the autorotation comprise adjusting fuel flow to the first engine **10₁** to maintain a rotational speed of the output shaft **28₁** of the first engine **10₁** substantially at a rotational speed target. The rotational speed target may be set at any suitable value. For instance, accommodating for the autorotation may comprise reducing fuel flow to the first engine **10₁** in order to maintain the output shaft **28₁** of the first engine **10₁** substantially at 100 percent (%) speed. The first controller **211** communicates with a first fuel control unit **221** that adjusts the fuel flow to the first engine **10₁** as instructed by the controller **211**. Accommodating for the autorotation may comprise waiting for the rotational speed of the rotor **242** to slow down to the rotational speed of the first output shaft **28₁** and/or increasing fuel flow to increase the rotational speed of the first output shaft **28₁** in an attempt to meet the rotational speed of the rotor **242**. As used herein, accommodating an autorotation corresponds to any response mechanism(s) and/or action(s) typically used in the context of an automatic decoupling of an engine output shaft.

A second speed sensor **202** may be used to measure the rotational speed of the second output shaft **28₂** and provide the rotational speed to a second engine controller **212**. The second engine controller **212** may function in a similar manner as the first engine controller **211** described above and communicate with a second fuel control unit **222** to adjust the fuel flow to the second engine **10₂** in order to control the rotational speed of the second output shaft **28₂**.

In the embodiment illustrated in FIG. 2A, the first controller **211** and the second controller **212** are in communication with each other. The first controller **211** can provide the torque and/or the rotational speed of the first engine **10₁** to the second controller **212** and the second controller **212** can provide the torque and/or the rotational speed of the second engine **10₂** to the first controller **211**. For example, when the first controller **211** detects a decrease in torque and/or an increase in rotational speed of the first engine **10₁**, the first controller **211** may request from the second controller **211** the torque and/or the rotational speed of the second engine **10₂**. The second controller **212** may request torque and/or the rotational speed of the first engine **10₁** from the first controller **211** in a similar manner. In some embodiments, torque and/or the rotational speed of the engines **10₁**, **10₂** are shared between the controllers **211**, **212** without a given controller (e.g., controller **211**) making a request from the other controller (e.g., controller **212**).

In some embodiments, as shown in FIG. 2B, each speed sensor **201**, **202** is connected to both of the engine control-

lers **211**, **212**. This may be useful when, for example, the controllers **211**, **212** are not in communication with each other. As shown, each sensor **201**, **202** may have one output connected to both of the engine controllers **211**, **212**. Alternatively, each sensor **201**, **202** may have two separate outputs, where one output is connected to the first controller **211** and the other output connected to the second controller **212**. Accordingly, each engine controller **211**, **212** is able to obtain the torque and/or the rotational speed of the first engine **10₁** and the torque and/or the rotational speed of the second engine **10₂**.

The first controller **211** can confirm the autorotation of the first engine **10₁** or identify a shaft shear of the first engine **10₁** based on the torque of the engines **10₁**, **10₂**. The shaft shear may be of the output shaft **28₁** of the first engine **10₁** or of any other shaft (e.g., high pressure shaft **22** or the power shaft **26**) of the engine **10₁**. When both engines **10₁**, **10₂** are decreasing in torque, this is indicative an autorotation of the rotorcraft. However, when the first engine **10₁** is decreasing in torque and the second engine **10₂** is increasing in torque, this is indicative that a shaft shear of the first engine **10₁** has occurred (and that the second engine **10₂** is coupled with the rotor **242**). This is because, for example, when a complete shear of the first output shaft **28₁** occurs, this results in the torque of the first engine **10** decreasing to zero and the torque of the second engine **10₂** increasing as the entire load of the rotor **242** is taken by the second engine **10₂**.

The controller **211** can determine whether the torque of the second engine **10₂** has increased or decreased when the torque of the first engine **10₁** has decreased. When the controller **211** has determined that the torque of the second engine **10₂** has decreased, the autorotation of the first engine **10₁** is confirmed and the accommodating of the autorotation of the first engine **10₃** is maintained. The first controller **211** can maintain accommodating the autorotation until the first output shaft **28₁** become re-engaged with the gearbox **232** and the first output shaft **28₁** rotates at the same speed as the rotor **242**.

When the controller **211** has determined that the torque of the second engine **10₂** has not decreased (i.e., has increased or is the same), the controller **211** identifies a shaft shear of the first engine **10₁** and ends the accommodating of the autorotation. In accordance with an embodiment, when the controller **211** identifies a shaft shear, the controller **211** transitions from accommodating for the autorotation to accommodation for the shaft shear. In some embodiments, when a shaft shear of the first engine **10₁** is identified, the first controller **211** may reduce fuel flow to the first engine **10₁**. In some embodiments, when a shaft shear of the first engine **10₁** is identified, the first controller **211** may command a shut-off of fuel to the first engine **10₁** in order to shut-off the first engine **10₁**. The shut-off of the first engine **10₁** may be delayed as long as the rotational speed of the first output shaft **28₁** is maintained below an overspeed threshold. The overspeed threshold may be in the range of 120% to 130% speed, for example. Alternatively, or in combination therewith, when a shaft shear of the first engine **10₁** is identified, the controller **211** may continue to keep the first engine **10₁** running in order to maintain cabin bleed air and/or extractions, such as maintaining electrical generators and hydraulic pumps. The first engine **10₁** may continue to run until it is determined that it may be shut down.

The second controller **212** may function in a similar manner to the first controller in order to confirm and maintain an autorotation of the second engine **10₂** or to

identify a shaft shear of the second engine 10_2 and end the accommodating of the autorotation of the second engine 10_2 .

With reference to FIG. 3, there is illustrated a flowchart of a method 300 for operating an engine, such as the first engine 10_1 . At step 302, a first parameter indicative of torque of the first engine 10_1 is obtained. In some embodiments, the first parameter is the torque of the first engine 10_1 . In other embodiments, the first parameter is a rate of change of the torque of the first engine 10_1 . Obtaining the first parameter may comprise determining the first parameter based on measurements obtained from at least one sensor of the first engine 10_1 , such as the speed sensor 201. This may comprise obtaining the rotational speed of the first engine 10_1 and determining the first parameter based on the obtained rotational speed of the first engine 10_1 . At step 304, a decrease in the first parameter is detected. In some embodiments, detecting a decrease of the first parameter comprises detecting a sudden drop of torque to 0% or close to 0%. Alternatively, a predetermined threshold may be used to compare the first parameter, whereby a decrease in the first parameter is detected when the first parameter falls below the threshold.

In some embodiments when the rotational speed of the first engine 10_1 is obtained, the method 300 comprises detecting an increase of the rotational speed of the first engine 10_1 . The increase of the rotational speed of the first engine 10_1 may be detected by detecting an increase in the rate of change of the rotational speed of the first engine 10_1 . The speed or rate of change of speed may be compared to a threshold and an increase may be detected when the threshold is exceeded. Note that steps 304 and 308 may be performed concurrently. Steps 302, 304, and 308 may be performed in any order, with step 304 always following step 302 and with step 308 always after step 302. In some embodiments, a first measurement (i.e. torque or speed) is obtained and the second measurement (i.e. speed or torque) is only obtained if a change in the first measurement (i.e. a decrease in torque or an increase in speed) is detected. Other scenarios are also considered.

At step 310, an autorotation of the first engine 10_1 is accommodated. In some embodiments, step 310 is performed in response to detecting the decrease of the first parameter at step 304. In some embodiments, step 310 is performed in response to detecting an increase of the rotational speed at step 308. In some embodiments, step 310 is performed in response to detecting the decrease of the first parameter at step 304 and detecting the increase of the rotational speed at step 308. In accordance with an embodiment, accommodating for the autorotation comprise adjusting fuel flow to the first engine 10_1 to maintain a rotational speed of the output shaft 28_1 of the first engine 10_1 substantially at a rotational speed target. For example, accommodating for the autorotation may comprise reducing fuel flow to the first engine 10_1 in order to maintain the rotational speed of the first engine 10_1 substantially at 100 percent speed. Other accommodation mechanisms known to those skilled in the art may also be used.

At step 312, the method 300 comprises assessing a second parameter indicative of torque of the second engine 10_2 while accommodating the autorotation. In some embodiments, the second parameter is torque of the second engine 10_2 . In other embodiments, the second parameter is a rate of change of torque of the second engine 10_2 . The second parameter may be obtained from an engine computer associated with the second engine 10_2 , such as the second engine controller 212. Alternatively, the second parameter may be

determined based on measurements obtained from at least one sensor of the second engine 10_2 , such as the speed sensor 202.

In some embodiments, method 300 comprises at step 314 determining whether a rotational speed of the second engine 10_2 has increased when the rotational speed of the first engine 10_2 has increased. At step 314, an assessment of the rotational speed of the second engine 10_2 is made. The rotational speed of the second engine 10_2 may be obtained from the engine computer associated with the second engine 10_2 or may be obtained from at least one sensor of the second engine 10_2 , such as the speed sensor 202. This may comprise obtaining the rotational speed of the second engine 10_2 and determining the second parameter based on the obtained rotational speed of the second engine 10_2 . The increase of the rotational speed of the second engine 10_2 may be detected by detecting an increase in the rate of change of the rotational speed of the second engine 10_2 .

At step 316, if the second parameter has decreased, the accommodating of the autorotation is maintained. In some embodiments, if the decrease of the second parameter is determined to have occurred and the rotational speed of the second engine 10_2 has increased, accommodating of the autorotation is maintained.

At step 318, when the second parameter has not decreased, shaft shear of the first engine 10_1 is identified and the method 300 ends the accommodating of the autorotation.

In some embodiments, at step 320, a shut-off of fuel to the first engine 10_1 is commanded in response to identifying the shaft shear of the first engine 10_1 . In some embodiments, at step 322, the rotational speed of the first engine 10_1 is maintained below an overspeed threshold in response to identifying the shaft shear of the first engine 10_1 .

The method 300 may similarly be used for operating the second engine 10_2 such that both the engines 10_1 , 10_2 operate according to the method 300.

It should be appreciated that as both a shaft shear and an autorotation can result in torque on an output shaft dropping to zero that the systems and/or methods described herein may be used to avoid mistakenly identifying an autorotation as a shaft shear, or vice versa. In other words, the systems and/or methods described herein may be used to detect either a shaft shear of one of the engines 10_1 , 10_2 or an autorotation of the rotorcraft, in order to distinguish between shaft shear and autorotation events.

With reference to FIG. 4, an example of a computing device 400 is illustrated. The system 200 may be implemented with one or more computing devices 400. For example, each of the controllers 211, 212 may be implemented by a separate computing device 400. Similarly, the method 300 may be implemented with the computing device 400. The computing device 400 comprises a processing unit 412 and a memory 414 which has stored therein computer-executable instructions 416. The processing unit 412 may comprise any suitable devices configured to implement the method 300 such that instructions 416, when executed by the computing device 400 or other programmable apparatus, may cause the functions/acts/steps performed as part of the method 300 as described herein to be executed. The processing unit 412 may comprise, for example, any type of general-purpose microprocessor or microcontroller, a digital signal processing (DSP) processor, a central processing unit (CPU), an integrated circuit, a field programmable gate array (FPGA), a reconfigurable processor, other suitably programmed or programmable logic circuits, or any combination thereof.

The memory **414** may comprise any suitable known or other machine-readable storage medium. The memory **414** may comprise non-transitory computer readable storage medium, for example, but not limited to, an electronic, magnetic, optical, electromagnetic, infrared, or semiconductor system, apparatus, or device, or any suitable combination of the foregoing. The memory **414** may include a suitable combination of any type of computer memory that is located either internally or externally to device, for example random-access memory (RAM), read-only memory (ROM), compact disc read-only memory (CDROM), electro-optical memory, magneto-optical memory, erasable programmable read-only memory (EPROM), and electrically-erasable programmable read-only memory (EEPROM), Ferroelectric RAM (FRAM) or the like. Memory **414** may comprise any storage means (e.g., devices) suitable for retrievably storing machine-readable instructions **416** executable by processing unit **412**, Note that the computing device **400** can be implemented as part of a full-authority digital engine controls (FADEC) or other similar device, including electronic engine control (EEC), engine control unit (ECU), electronic propeller control, propeller control unit, and the like.

The methods and systems for operating an engine described herein may be implemented in a high level procedural or object oriented programming or scripting language, or a combination thereof, to communicate with or assist in the operation of a computer system, for example the computing device **400**. Alternatively, the methods and systems for operating an engine may be implemented in assembly or machine language. The language may be a compiled or interpreted language. Program code for implementing the methods and systems for operating an engine may be stored on a storage media or a device, for example a ROM, a magnetic disk, an optical disc, a flash drive, or any other suitable storage media or device. The program code may be readable by a general or special-purpose programmable computer for configuring and operating the computer when the storage media or device is read by the computer to perform the procedures described herein. Embodiments of the methods and systems for operating an engine may also be considered to be implemented by way of a non-transitory computer-readable storage medium having a computer program stored thereon. The computer program may comprise computer-readable instructions which cause a computer, or more specifically the processing unit **412** of the computing device **400**, to operate in a specific and predefined manner to perform the functions described herein, for example those described in the method **300**.

Computer-executable instructions may be in many forms, including program modules, executed by one or more computers or other devices. Generally, program modules include routines, programs, objects, components, data structures, etc., that perform particular tasks or implement particular abstract data types. Typically the functionality of the program modules may be combined or distributed as desired in various embodiments.

The above description is meant to be exemplary only, and one skilled in the art will recognize that changes may be made to the embodiments described without departing from the scope of the invention disclosed. Still other modifications which fall within the scope of the present invention will be apparent to those skilled in the art, in light of a review of this disclosure.

Various aspects of the methods and systems for operating an engine may be used alone, in combination, or in a variety of arrangements not specifically discussed in the embodiments described in the foregoing and is therefore not limited

in its application to the details and arrangement of components set forth in the foregoing description or illustrated in the drawings. For example, aspects described in one embodiment may be combined in any manner with aspects described in other embodiments. Although particular embodiments have been shown and described, it will be obvious to those skilled in the art that changes and modifications may be made without departing from this invention in its broader aspects. The scope of the following claims should not be limited by the embodiments set forth in the examples, but should be given the broadest reasonable interpretation consistent with the description as a whole.

What is claimed is:

1. A method for operating an engine in a multi-engine rotorcraft, the method comprising:

obtaining a first parameter indicative of torque of a first engine;

detecting a decrease of the first parameter indicative of torque of the first engine;

initially accommodating an autorotation of the first engine in response to detecting the decrease of the first parameter and maintaining a rotational speed of the first engine below an overspeed threshold;

concurrently with accommodating the autorotation of the first engine, assessing a second parameter indicative of torque of a second engine of the rotorcraft to distinguish between the autorotation and a shaft shear of the first engine;

when the second parameter has not decreased, identifying a shaft shear of the first engine and transitioning from the accommodating of the autorotation to an accommodating of the shaft shear of the first engine; and

when the second parameter has decreased, maintaining the accommodating of the autorotation of the first engine.

2. The method of claim **1**, wherein the first parameter is torque of the first engine and the second parameter is torque of the second engine.

3. The method of claim **1**, wherein the first parameter is a rate of change of the torque of the first engine and the second parameter is a rate of change of the torque of the second engine.

4. The method of claim **2**, further comprising detecting an increase of a rotational speed of the first engine, and wherein the autorotation is accommodated in response to detecting the decrease of the first parameter and the increase in the rotational speed.

5. The method of claim **4**, further comprising assessing a rotational speed of the second engine, and wherein the accommodating is maintained when the second parameter has decreased and the rotational speed of the second engine has increased.

6. The method of claim **1**, wherein accommodating the shaft shear of the first engine comprises commanding a shut-off of fuel to the first engine.

7. The method of claim **1**, wherein maintaining the rotational speed of the first engine below the overspeed threshold comprises reducing fuel flow to the first engine.

8. The method of claim **1**, wherein accommodating the autorotation comprises reducing fuel flow to the first engine and maintaining a rotational speed of the first engine to a rotational speed target.

9. The method of claim **1**, further comprising obtaining the second parameter from an engine computer associated with the second engine.

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10. The method of claim 1, further comprising determining the second parameter based on measurements obtained from at least one sensor of the second engine.

11. A system for operating an engine in a multi-engine rotorcraft, the system comprising:

at least one processing unit; and

at least one non-transitory computer-readable memory having stored thereon program instructions executable by the at least one processing unit, which when executed, cause the processing unit to:

obtain a first parameter indicative of torque of a first engine;

detect a decrease of the first parameter indicative of torque of the first engine;

initially accommodate an autorotation of the first engine in response to detecting the decrease of the first parameter and maintain a rotational speed of the first engine below an overspeed threshold;

concurrent, with accommodating the autorotation of the first engine, assess a second parameter indicative of torque of a second engine of the rotorcraft to distinguish between the autorotation and a shaft shear of the first engine;

when the second parameter has not decreased, identify a shaft shear of the first engine and transition from the accommodating of the autorotation to an accommodating of the shaft shear of the first engine; and when the second parameter has decreased, maintain the accommodating of the autorotation of the first engine.

12. The system of claim 11, wherein the first parameter is torque of the first engine and the second parameter is torque of the second engine.

13. The system of claim 11, wherein the first parameter is a rate of change of the torque of the first engine and the second parameter is a rate of change of the torque of the second engine.

14. The system of claim 12, wherein the program instructions are further executable by the at least one processing unit to detect an increase of a rotational speed of the first engine, and wherein the autorotation is accommodated in response to detecting the decrease of the first parameter and the increase in the rotational speed.

15. The system of claim 14, wherein the program instructions are further executable by the at least one processing unit to assess a rotational speed of the second engine, and

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wherein the accommodating is maintained when the second parameter has decreased and the rotational speed of the second engine has increased.

16. The system of claim 11, wherein accommodating the shaft shear of the first engine comprises commanding a shut-off of fuel to the first engine in response to identifying the shaft shear of the first engine.

17. The system of claim 11, wherein maintaining the rotational speed of the first engine below the overspeed threshold in response to identifying the shaft shear of the first engine comprises reducing fuel flow to the first engine.

18. The system of claim 11, wherein accommodating the autorotation comprises reducing fuel flow to the first engine and maintaining a rotational speed of the first engine to a rotational speed target.

19. The system of claim 11, wherein the program instructions are further executable by the at least one processing unit to obtain the second parameter from an engine computer associated with the second engine.

20. A method for operating an engine in a multi-engine rotorcraft, the method comprising:

obtaining a first parameter indicative of torque of a first engine;

detecting a decrease of the first parameter indicative of torque of the first engine;

in response to detecting the decrease of the first parameter, initially accommodating an autorotation of the first engine by adjusting fuel flow to the first engine to maintain a rotational speed of the first engine substantially at a rotational speed target;

concurrently with accommodating the autorotation of the first engine, assessing a second parameter indicative of torque of a second engine of the rotorcraft to distinguish between the autorotation and a shaft shear of the first engine;

when the second parameter has not decreased, identifying a shaft shear of the first engine and transitioning from the accommodating of the autorotation to an accommodating of the shaft shear of the first engine; and

when the second parameter has decreased, maintaining the accommodating of the autorotation of the first engine.

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